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EP 0076972 US 3787660  
US 4284808

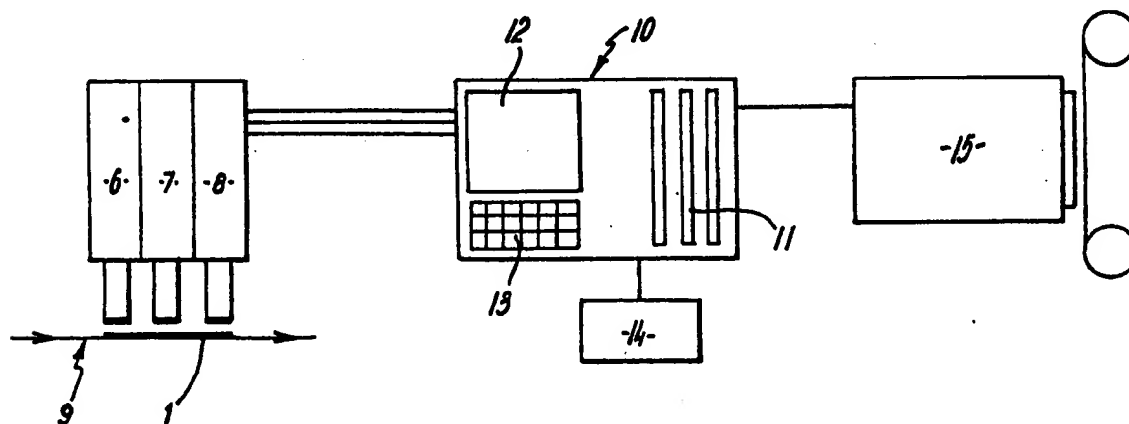
(58) Field of search  
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### (54) Printing apparatus

(57) Printing (eg laser or ink drop) apparatus has an optical scanner (6) such as a video camera which is used to scan data such as names and addresses on forms (1). The scanner (6) is connected to a printer (15) so the scanned data can be facsimile printed onto printed matter such as labels. The apparatus may also incorporate a code reader (7, 8) and a system (11) for storage and selective retrieval. Data relating to a particular class of document can then be retrieved by reference to coded information which was read off the forms (1) and is stored in conjunction with the scanned data.

The system finds use in transcribing postal addresses from application forms to postal address labels.



**FIG. 1**

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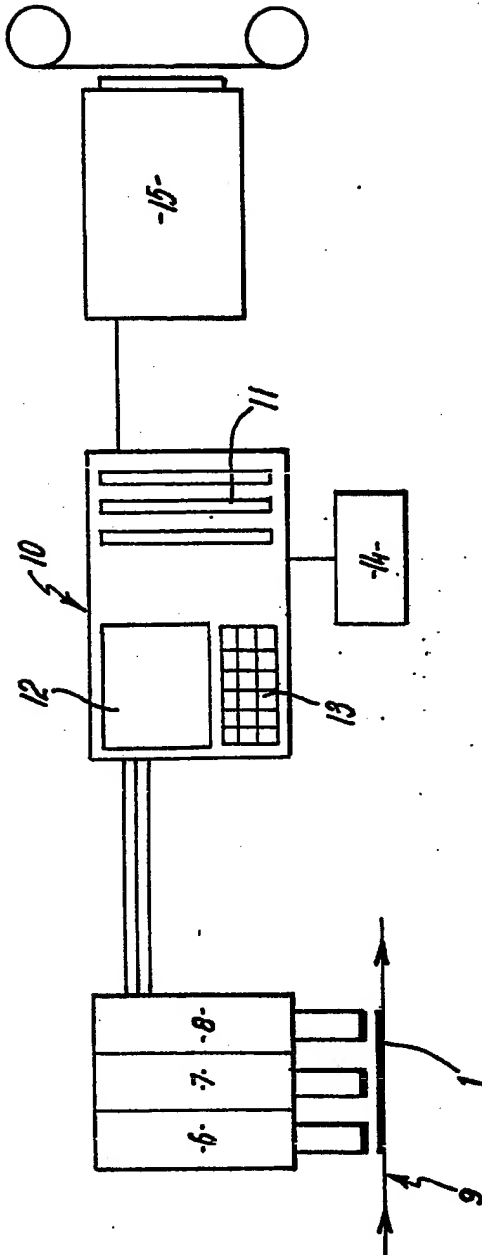


FIG. 1

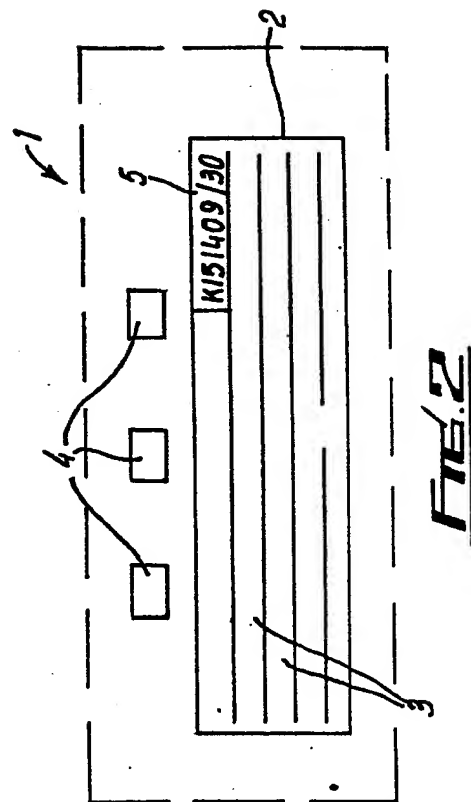


FIG. 2

## SPECIFICATION

### Printing apparatus

This invention relates to apparatus for use in  
5 generating printed matter, particularly although not  
exclusively printed labels.

In the marketing of certain products, for example,  
packaged breakfast cereals, confectionery, etc. It is  
common to use promotional offers whereby goods  
10 can be obtained free or at a reduced price in  
exchange for tokens which are given with the  
product as purchased. Usually, a person wishing to  
obtain such promotional goods is required to send  
the tokens, together with a form on which he has  
15 written his name and address, to a central location  
where different forms relating to different goods,  
and perhaps also to different promotional offers, are  
separated into the respective different categories  
and the appropriate goods are despatched to the  
20 pertaining addresses. Customarily the separation of  
the forms is effected manually and the packaged  
goods to be despatched are addressed by  
attachment thereto of cut-out portions of the forms  
or labels bearing written or printed addresses  
25 individually copied for the forms. This known  
procedure is however particularly laborious and  
time-consuming and, for efficient and speedy  
operation, a relatively large number of personnel is  
required.

An object of the present invention is to provide  
printing apparatus with which printed matter, such  
as printed labels, can be derived from data on  
different forms or the like in a quick and convenient  
manner.

According to the invention therefore there is  
provided printing apparatus for generating printed  
matter from a plurality of forms or the like which  
bear marked data, said apparatus comprising an  
optical scanning device operable to scan said forms  
40 or the like and to produce an output representative  
of the visual appearance of said marked data, and a  
printer arranged to receive said output and operable  
to effect printing of matter with the corresponding  
marked data.

With this arrangement, printed matter, such as  
labels printed with names and addresses, can be  
generated from forms or the like in a particularly  
quick and convenient manner and with minimal  
manual involvement. In particular, typing or other  
50 laborious digit-by-digit transfer of data from the  
forms or the like to the printed matter is not  
necessary.

Preferably the apparatus further includes one or  
more code readers which scan the forms or the like  
55 simultaneously with (or prior or subsequently to)  
operation of the optical scanning device so as to  
obtain machine-readable information from the  
forms or the like as well as deriving data  
representing the visual appearance of the marked  
60 data, such code reader or readers being connected  
to a processing and storage device operable to  
interpret the information and produce an output  
representative thereof. In this way, as the forms or  
the like are scanned to derive printed matter  
65 therefrom it is advantageously also possible to

derive appropriate statistical information which may  
be of value from an auditing and/or marketing point  
of view depending on the nature of the machine-  
readable information.

In so far as it is necessary to relate the generated  
printed matter to other information on the forms or  
the like, as would be the case where, for example,  
different forms relate to different goods ordered, the  
distinction between different items of printed matter  
75 may be achieved by manually sorting the forms or  
the like as they are presented to the optical scanning  
device, or by utilising information from the forms or  
the like, such as the abovementioned machine-  
readable information, to effect automatic sorting. In  
80 the former respect, a batch of manually sorted  
forms or the like may be presented to the optical  
scanning device so as to produce a corresponding  
batch of common category items of printed matter,  
or forms of different kinds may be identified as such  
85 (e.g. by operating appropriate switches) as they are  
fed to the scanning device so that the corresponding  
items of printed matter are correspondingly  
distinguished from each other (e.g. by suitable code  
marks at the printer or by actuation of a  
90 corresponding one of a range of different printing  
heads or different feed devices for feeding labels or  
other matter to be printed to the printer). Where  
automatic sorting is effected, the distinction  
between different items of printed matter may be  
95 effected as last mentioned above in relation to  
manual sorting or, alternatively, may be effected by  
storing the different items of marked data with  
reference to the machine-readable data in a suitable  
data storage system whereby data can be retrieved  
100 for the purposes of operating the printer  
automatically or on demand in batches of common-  
category items of printed matter as identified by the  
machine-readable data. For example, stored data  
corresponding to the scanning device output, for  
105 example comprising facsimile representations of  
names and addresses, may be stored with reference  
to machine-readable data which may correspond to  
simple yes/no selections (e.g. marked boxes on  
order forms indicating which particular goods are  
110 required) and/or which may correspond to more  
complicated alphanumeric codes (e.g. identifying in  
some detail the origin and nature of an order form).  
Retrieval of first outputs can be effected e.g. by  
instructing the data processing and storage device  
115 to search for all stored data derived from forms on  
which a particular yes/no selection has been made  
and/or which relate to a particular promotional offer  
or the like.

The apparatus of the invention is of particular  
120 application for generating address labels for use in  
the despatch of different goods requested with a  
plurality of different order forms, as in the case of  
goods supplied by post in connection with  
promotional offers as discussed above. It is  
125 however to be understood that the invention is not  
intended to be restricted to this field of application  
and the apparatus of the invention may be used in  
any suitable context for any suitable purpose.

With regard to the said optical scanning device  
130 this may take any suitable form. Most conveniently,

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the device comprises a video camera which produces digital data corresponding to the appearance of a field of vision scanned by the camera. Where an auxiliary code reader is provided as mentioned above this may comprise an OCR (optical character recognition) device and/or an OMR (optical mark recognition) device and a bar code reader.

- In practice, the scanning device and any code reader or readers will preferably be disposed in conjunction with a feed device, such as guide slot, conveyor belt or the like, whereby appropriate portions of the forms or the like are automatically scanned after insertion into the feed device.
- Auxiliary devices may be provided to facilitate collection of the desired information. For example, where the forms or the like contain extraneous matter not required to be read, such as guide lines, instructions, etc., these may be printed in a particular colour, say red, and the optical scanning device may be provided with a filter to eliminate information in this colour.

- Whilst it is an advantage of the invention that the minimum of manual activity is required to generate the resulting printed matter, if desired, it is possible to supplement the information derived from the scanning device with manually entered information. For example, as each form or the like is scanned, some corresponding data, e.g. a post code, may be entered by keyboard and this may be stored e.g. to facilitate searching for stored names and addresses.

- With regard to the printer, this may take any suitable form although preferably a high speed accurate "writing" printer, such as an ink jet or laser printer, is used so as to be capable of reproducing the marked data (e.g. the names and addresses) quickly, accurately and neatly.

- The invention will now be described further by way of example only and with reference to the accompanying drawings in which:—

Figure 1 is a diagrammatic representation of one form of apparatus according to the invention; and

Figure 2 shows a form suitable for use with the apparatus of Figure 1.

- With reference to Figure 2 a promotional offer for example accompanying a packaged breakfast cereal, involves a form 1 printed on the side of the cereal package. The purchaser of the cereal can obtain goods free or at a reduced price by sending the form, together with tokens cut out of a number of the packages, to a central location. The form contains a large box 2 with guide lines 3 where the purchaser's name and address is to be entered, and also a number of smaller boxes 4 corresponding to different goods which can be obtained. One of the smaller boxes is ticked by the purchaser to indicate that required goods. Also, the form includes a printed alphanumeric code 5 the digits of which indicate different items of information such as the nature of the product, the size of the product, the nature of the promotional offer, etc.

- At the abovementioned central location there is apparatus as shown in Figure 1. The apparatus comprises an optical scanning device 6 and two code readers 7, 8 mounted in relation to a feed

device 9 which may comprise a conveyor.

- The conveyor 9 is arranged so that individual forms 1 can be manually located thereon to be moved successively through positions in which the reader 7 scans the small boxes 4, the device 6 scans the large box 2 and the reader 8 scans the code 5. The device 6 comprises a video camera which generates a digitally encoded picture of the contents of the box 2. The reader 7 comprises an OMR reader which produces an output if a tick (or any other mark) is detected in any one of the boxes 4. The other reader 8 comprises an OCR reader which produces a digital signal corresponding to the identity of the alphanumeric characters in the code.

- The outline of the box 2 and any other intrusive extraneous matter (such as the code 5) may be printed in red and the purchaser may be instructed to enter his name and address in blue or black. In this way, the extraneous matter can be screened from the video camera 6 by using an appropriate filter.

- The scanning device 6 and the readers 7, 8 are connected to a computer 10 having the usual central processing unit and connected to a disc storage device 11 and also peripherals such as a monitor screen 12, a keyboard 13 and a local printer 14.

- As each form is read by the scanning device 6 and the readers 7, 8, the outputs of such device and readers are fed to the computer 10. Within the computer, the sequence of data corresponding to the video camera output is stored on disc with reference to the data derived from the code 5 and the ticked boxes 4. At this stage it is also possible to enter further data via the keyboard 13 if desired.

- After reading of a batch of forms, e.g. all forms received by post on a particular day, which forms may differ in terms of the characteristics of the product from which the form has been obtained, the goods selected, and the nature of the promotional offer, it is possible to use the computer to derive statistical data as required. Thus, for example, the stored data can be scanned to determine how many forms have been received from a particular size of package. The resulting statistical information may be displayed on the screen 12 or printed on the local printer 14.

- When it is desired to despatch goods the computer is instructed to scan the stored data and retrieve all names and addresses of those purchasers who have requested a particular category of offered goods. A main label printer 15 is connected to the computer 10 and this then prints labels with the names and addresses. The printer 15 is a high speed laser or ink jet printer which acts to print dots at coordinates corresponding to the coordinates of digital data derived by the video camera. That is, the printer 15 produces a facsimile of the entry in the box 2 on the original form 1 without any recognition of the alphanumeric characters making up the entry having been made at any stage.

- The labels are applied to the packaged goods which are then despatched. Labels relating to a different category of goods can then be printed. After printing of labels the stored data can be wholly

or partially cancelled or retained as desired.

With the arrangement described above labels relating to different goods can be generated quickly and conveniently and with little manual

5 involvement. Moreover a wide range of statistical information can be readily made available.

It is of course to be understood that the invention is not intended to be restricted to the above details which are described by way of example only.

10 Thus, whilst the arrangement described is highly automated in that the generation of printed labels is derived from stored data produced by automatic scanning of the forms, it is to be understood that the level of automation may be lower in that the labels  
15 may be produced directly from the forms without any storage of the names and addresses data (or with only short term storage in buffer memory), the distinction between different labels for different goods then being achieved by manual sorting of the  
20 forms prior to insertion into the feed device, or by operating a control on the computer as each form is inserted so as to identify the category of goods to the printer, the printer then actuating an appropriate label feed or applying an identifying mark to the  
25 label or otherwise taking appropriate distinguishing action.

Although Figure 1 shows only a single scanning arrangement, a single computer and a single printer, there may be a plurality of any one or all of  
30 these as desired.

Whilst the above specific description is directed to the generation of addressed labels from forms used in promotional offers, it is to be understood that the invention is not intended to be restricted to this field  
35 of application. The invention may be utilised in any suitable context where printed matter is required to be generated quickly and conveniently, directly or after storage thereof, from a form or the like. Thus, the invention may be utilised in the production of  
40 printed records, addressed envelopes, signed cheques, identifying labels, security passes,

certificates, etc., working from official forms, medical prescriptions, business cards, competition or pools entries, official documents, certificates etc.

#### 45 CLAIMS

1. Printing apparatus for generating printed matter from a plurality of forms or the like which bear marked data, said apparatus comprising an optical scanning device operable to scan said forms  
50 or the like and to produce an output representative of the visual appearance of said marked data, and a printer arranged to receive said output and operable to effect printing of matter with the corresponding marked data.

55 2. Printing apparatus according to claim 1 further including one or more code readers which scan the forms or the like so as to obtain machine-readable information therefrom.

60 3. Printing apparatus according to claim 2 further including a data storage system and wherein different items of said marked data are arranged to be stored with reference to said machine-readable information, whereby data can be retrieved for the purpose of operating the printer as identified by the  
65 machine-readable information.

4. Printing apparatus according to claim 3, wherein said stored data comprises facsimile representations of names and addresses.

70 5. Printing apparatus according to any one of claims 1 to 4 wherein the optical scanning device comprises a video camera which produces digital data corresponding to the appearance of a field of vision scanned by the camera.

6. Printing apparatus according to any one of  
75 claims 1 to 5 wherein the printer comprises an ink jet or laser printer.

7. Printing apparatus according to claim 1, substantially as hereinbefore described with reference to and as illustrated in the accompanying  
80 drawings.

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